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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,106	05/05/2005	Kunihiro Ichimura	OPC-C511	7016
7590 08/22/2007				
George A. Loud, Esquire BACON & THOMAS Fourth Floor 625 Slaters Lane Alexandria, VA 22314-1176		EXAMINER JOHNSON, CONNIE P		
		ART UNIT PAPER NUMBER 1752		
		MAIL DATE DELIVERY MODE 08/22/2007 PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/520,106	Applicant(s) ICHIMURA ET AL.	
	Examiner Connie P. Johnson	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-26 and 28-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-26 and 28-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Response to Amendment***

1. The remarks and amendment filed 6/6/2007 have been entered and fully considered.
2. Claims 15-26 and 28-35.
3. Claim 27 is cancelled.
4. Claims 31-35 are new.
5. The 112, 2<sup>nd</sup> paragraph rejection over claim 27 is withdrawn.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 15-19, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al., U.S. Patent No. 5,952,150.

Ohta teaches a radiation-sensitive resin composition comprising a photoacid generator (acid former) (col. 3, lines 52-57). The radiation-sensitive resin composition also comprises surfactants that are water-soluble polymers, such as the following in column 34, lines 47-62:

nonionic surfactants are polyoxyethylene higher-alkyl ethers, polyoxyethylene higher-alkyl phenyl ethers, polyoxyethylene glycol higher-fatty acid diesters, and products commercially available under the trademarks, such as KP™ (manufactured by Sin-Etsu Chemical Co., Ltd.), Polyflows™ (manufactured by Kyoceri Oil and Fat Chemical Co., Ltd.), Efftops™ (manufactured by Tokem Products), Megafacks™ (manufactured by Daicippou Ink and Chemicals Co., Ltd.), Florades™ (manufactured by Sumitomo 3M Co., Ltd.), Asahi Guard™ and Surflon™ (manufactured by Asahi Glass Co., Ltd.).

The composition also comprises a sensitizer in an amount of 50 parts by weight or less based on 100 parts by wt of the resin composition (col. 35, lines 1-12). The crosslinking agent taught by Ohta, meets the limitation of the acid-reactive insolubilizing agent. The crosslinking agent comprises substituents with formyl groups. Further, the substituents comprise epoxy compounds of bisphenol S, novolak resin-type epoxy compounds, resol-resin type epoxy compounds (col. 31, lines 27-67). The acid generator (acid former) taught by Ohta may be present in the composition in an amount of .001-70 parts by weight (col. 33, line 19). The crosslinker (acid-reactive insolubilizing agent) is present in an amount of 5-95 parts by weight (col. 33, line 20). Ohta also teaches a method for preparing a resist pattern from the radiation-sensitive composition. The method comprises preparing the radiation-sensitive resin composition and applying the composition to a substrate. The coating is heated to form a resist coating. The process results in a resist film (radiation-sensitive resin film) as in instant claim 26 (col. 36, lines 9-18). "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re

Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) (see MPEP 2113). The resist film formed by the patterning process of Ohta is suitable for a screen printing process because the resist film composition meets the limitations of the radiation-sensitive resin composition as claimed. Ohta also teaches using water-soluble organic solvents when developing the photosensitive composition (col. 36, lines 45-49). Ohta does not specifically teach using water as the solvent in the composition.

However, it would have been obvious to one of ordinary skill in the art to use water as a solvent in the composition of Ohta because Ohta teaches water-soluble polymers in the composition, water-soluble solvents in the developer and further, rinsing the composition with water after development.

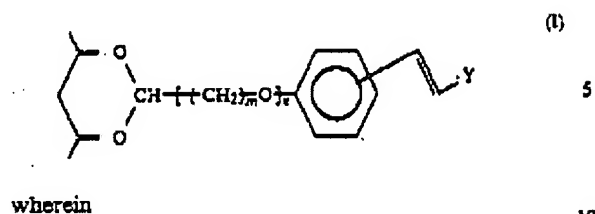
8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al., U.S. Patent No. 6,465,146 B1.

Kawamura teaches a radiation-sensitive composition comprising pigment particles (sensitizer) with a particle diameter of 0.01 to 10  $\mu\text{m}$  (col. 8, lines 53-55). The composition also comprises a water-soluble binder (col. 17, line 50). Kawamura also teaches a water-insoluble solid that meets the limitation of the acid-reactive insolubilizing agent in instant claim 15 (col. 34, line 46). The composition also comprises an acid generator (col. 36, line 48). Kawamura also teaches that water may be used as a solvent in the composition (see col. 39, line 35). Kawamura does not specifically teach that water is the only solvent in the composition. However, it would have been obvious to one of ordinary skill in the art to use water as the solvent because Kawamura teaches water-soluble components in the composition.

9. Claims 15, 20, 21, 22, 23, 25-29, 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichimura et al., U.S. Patent No. 4,777,114 in view of Narahara et al., U.S. Patent No. 6,190,834 B1.

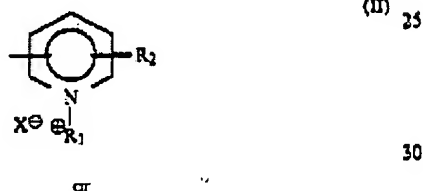
Ichimura teaches a photosensitive resin emulsion comprising a film-forming resin and a protective colloid (abstract). The photosensitive resin emulsion comprises a photosensitive unit and a saponified polyvinyl acetate derivative with a hydrophobic unit bonded to the backbone (col. 2, lines 57-67). The photosensitive unit comprises a polyvinyl alcohol and styrylpyridinium group as in instant claim 22 (see column 3, figure 1).

Art Unit: 1752



stands for a vinyl alcohol unit residue of the saponi-  
fied polyvinyl acetate in the backbone, Y stands for  
a group represented by the following formula (II)  
or (III):

20



The film-forming polymer is a water-soluble polymer that may comprise such polymers as acrylic/acrylic acid copolymer and styrene polymer (col. 7, lines 31-45). Ichimura also teaches a method of forming a pattern. The method comprises preparing a resin emulsion composition and coating the film on a screen printing plate. The composition is heated to 60°C and stirred overnight prior to coating on the screen printing plate. The composition was dried and irradiated with light. After exposure, the composition was developed with water (see example 1, column 8). Ichimura does teach a photosensitive

composition. However, the Ichimura does not teach an acid former and sensitizer in the resin emulsion composition.

However, Narahara teaches a photosensitive resin composition comprising an epoxy resin (acid-reactive insolubilizing agent) and a second resin with an ethylenically unsaturated bond in the side chain (abstract). The composition may be used in a screen printing process (col. 14, lines 55-59). The composition may also comprise a sensitizer and a photo-acid generating agent (col. 9, lines 50-52). It would have been obvious to one of ordinary skill in the art to use the photo-acid generator and sensitizer of Narahara in the composition of Ichimura to increase the tack free property of the photosensitive film and improve surface roughening efficiency of the plated film of the resin composition material after curing (Narahara, col. 9, lines 62-65).

10. Claims 15, 25, 30-32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al., U.S. Patent No. 6,465,146 B1.

Kawamura teaches a radiation-sensitive composition as relied upon above. Kawamura teaches the composition comprises pigment particles and an acid generator. The pigment particles comprise a particle diameter of 0.01 to 10  $\mu\text{m}$  (col. 8, lines 53-55). The pigment particles (sensitizer) and acid generator are dispersed in water. Kawamura teaches the water-soluble composition as claimed, therefore it is expected that the composition would be developable with water. Kawamura also teaches that the composition may comprise water as the only solvent (col. 39, line 35). The reference also teaches organic resin particles in the composition. The organic resin particles are prepared by an emulsion polymerization method (col. 36, lines 23-27). Therefore, the



particles are emulsified when added to the composition. Kawamura does not teach that the acid generator is in the form of particles nor that the particle size is less than 1.5 $\mu$ m. However, it would have been obvious to one of ordinary skill in the art to add the acid generator in the form of particles to form a solubilizing particle mixture in the composition. Further, it would have been obvious to one of ordinary skill in the art that the particle size of the acid generator would be less than 1.5 $\mu$ m because the particle size is conventional.

### ***Response to Arguments***

11. Applicant's arguments, filed 6/6/2007 with respect to the rejection(s) of claim(s) 15-19, 24 and 26 under 102(b) and claim 15 under 102(e) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new ground(s) of rejection are made herein.

12. Applicant argues that Ohta does not teach or suggest a water-based composition and that the compositions of Ohta are solvent-based.

Ohta teaches photosensitive resin compositions comprising water-soluble polymers, such as surfactants. Therefore, it would follow to use water as a solvent in the composition because the composition comprises a water-soluble component. Further, the resin composition of Ohta also comprises alkali-insoluble or scarcely soluble resins. The alkali-insoluble resins are water-soluble (see column 25, lines Applicant has not further defined the amount of water comprised in the composition, therefore the water component of the Ohta reference meets the limitation of the claims.

13. Applicant argues that the surfactants that are characterized as water-soluble polymers, are not convertible into insoluble form by reaction with the insolubilizing agent as required by the pending claims.

Ohta teaches methoxy-methylated urea compounds and methylolated phenol compounds as in claim 17. Therefore, the crosslinking compounds of Ohta meet the limitations of insolubilizing agents for converting the water-soluble resin into an insoluble form in the presence of an acid.

14. Applicant argues that Kawamura does not teach any water-based energy sensitive composition.

Kawamura teaches water-soluble components in a radiation-sensitive composition. The water-soluble components comprise a water-soluble polymer (col. 17, line 50). Kawamura also teaches pigment particles (sensitizer) in the composition (col. 8, lines 53-55). Kawamura also teaches a water-insoluble solid that meets the limitation of the acid-reactive insolubilizing agent in instant claim 15 (col. 34, line 46). The composition also comprises an acid generator (col. 36, line 48). Kawamura definitely teaches the features of a radiation-sensitive resin composition as in claim 15. Kawamura teaches that the composition may comprise water as the solvent (col. 39, line 35). Since the composition comprises water-soluble components, it would follow to use water as the solvent.

15. Applicant argues that the printing plate of Kawamura does not require a developing step.

The 102(e) rejection over Kawamura is used to reject claim 15 only. Therefore, the developing step is not inclusive in the rejection.

16. Applicant argues that the water-soluble binder becomes water-soluble only after acted upon by heat or acid, whereas the water-soluble resin of claim 15 is dissolved in water and which becomes water-insoluble by reaction with the insolubilizing agent.

The limitation of claim 15 recites, "a water-soluble resin dissolved in water". The water-soluble resin of Kawamura meets this limitation. Further, Kawamura teaches that these polymers are acted upon by heat or acid to become water-soluble or alkali-soluble (col. 17, lines 50-53).

17. Applicant argues that the inorganic compound particles and not the acid-former or sensitizer, provide the tack free property and surface roughness.

Narahara teaches that sensitizers and inorganic particles form a tack-free composition (col. 8, lines 29-35). Further, the photo-acid generators improve surface roughening of the composition (col. 5, lines 53-62).

18. Applicant argues that Narahara does not teach the photoacid generator or sensitizer in the form of particles.

Applicant's argument is persuasive, therefore claim 30 is withdrawn from the 103(a) rejection over Ichimura in view of Narahara.

19. Applicant argues that Kawamura does not teach a water-based composition nor does the composition of Kawamura comprise a water-soluble resin.

Kawamura does teach a water-based composition. The composition comprises water-soluble polymers (col. 17, lines 55-60). The composition may also comprise

organic resin particles, such as polyhydroxystyrene and acrylic resin, which are water-soluble (col. 36, lines 11-15). Further, Kawamura teaches that the solvent for the composition may comprise water only (col. 39, line 35).

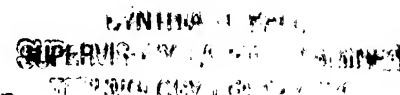
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Connie P. Johnson whose telephone number is 571-272-7758. The examiner can normally be reached on 7:30am-4:00pm Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Connie P. Johnson  
Examiner  
Art Unit 1752

A rectangular stamp with the word "SUPERVISOR" in a bold, sans-serif font. Below it, the name "CYNTHIA KELLY" is printed in a smaller font. There is also a date field which appears to contain "07/20/04".

A handwritten signature in black ink, appearing to read "Cynthia Kelly". The signature is fluid and cursive, written over the printed name and title.